

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT OFFICE OF HIGHWAYS		EDSM No: IV.4.1.2
ENGINEERING DIRECTIVES AND STANDARDS		
VOLUME	IV	Revision Date: 3/21/14
CHAPTER	4	Effective Date:
SECTION	1	Subject: LOUISIANA BRIDGE INSPECTION & LOAD RATING
DIRECTIVE	2	STANDARDS

1. PURPOSE:

To formally establish responsibility and standards for periodic safety inspection and load rating evaluation of all bridges on public roads in Louisiana.

2. SCOPE:

This directive covers the general policies of this Department regarding periodic safety inspection and load rating evaluation of bridges on public roads in Louisiana.

3. POLICY:

3.1 National Bridge and Inspection Standards (NBIS)

The *National Bridge and Inspection Standards (NBIS)*, as set forth in the *Code of Federal Regulations, Title 23 (Highways), Part 650 (Bridges, Structures and Hydraulics), Subpart C (National Bridge Inspection Standards)*, shall hereby apply to all structures **defined as highway bridges** that are located on all public roads fully or partially within the boundaries of the State of Louisiana.

NBIS definition of "bridge":

"Bridge: A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between under-copings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening."

3.2 The American Association of State Highway and Transportation Officials Manual for Bridge Evaluation (AASHTO MBE)

The *AASHTO MBE* is referenced by the *NBIS* for details concerning bridge inspections, bridge load ratings, bridge files and bridge inventory. Accordingly, all provisions of the *AASHTO MBE* apply to all bridges in the State of Louisiana that are governed by the *NBIS*.

3.3 Exceptions

Exceptions to these applications are limited to bridges located on public roads that are the responsibility of a Federal agency or private entity.

4. TERMINOLOGY:

4.1 NBIS and 23 CFR 650

In this *EDSM*, the term *23 CFR 650* shall be the abbreviation for the *Code of Federal Regulations, Title 23 (Highways), Part 650 (Bridges, Structures and Hydraulics), Subpart C (National Bridge Inspection Standards)*.

Since the *National Bridge Inspection Standards (NBIS)* are contained within 23 CFR 650, the terms *NBIS* and 23 CFR 650 are in effect synonymous. Terms such as 23 CFR 650.301 refer to a particular subsection within the *NBIS*.

4.2 Definitions

Definitions of terms used in this *EDSM* can be found in 23 CFR 650.305 of the *NBIS*.

5. IMPLEMENTATION:

The details of implementation set forth in this *EDSM* are intended to reinforce and/or augment the requirements established by the *NBIS* and by the *AASHTO MBE*.

5.1 Establishment of LADOTD Bridge Inspection Program

As required by 23 CFR § 650.307 of the *NBIS* and under the authority of Louisiana Revised Statute 48:35, *LADOTD* shall have a bridge inspection organization which shall be responsible for implementing:

- Statewide bridge inspection policies and procedures.
- Quality assurance and quality control for bridge inspections.
- Preparation and maintenance of a bridge inventory.
- Bridge inspections and the reports from those inspections.
- Bridge load ratings and the reports of those load ratings.
- Any other requirements or mandates of the FHWA through the *NBIS*.

This *EDSM* hereby establishes the *LADOTD Bridge Inspection Program* as the organization charged with implementing the responsibilities listed above. The functions necessary to carry out any of these responsibilities may be delegated, but any work contracted or delegated outside of *LADOTD* shall be completed in accordance with this *EDSM*.

5.2 Requirements for positions within the LADOTD Bridge Inspection Program

5.2.1 Program Manager

Qualifications for the *Program Manager* are specified in 23 CFR § 650.309 of the *NBIS*.

Per this *EDSM*, the *Program Manager* of the *LADOTD Bridge Inspection Program* shall be the *LADOTD Structures and Facilities Maintenance Engineer*.

Certain program manager duties may be delegated as necessary to effectively manage the *Louisiana Bridge Inspection Program*. Duties that have been delegated are as specified within the *Bridge Maintenance Directives*.

Delegation of any *Program Manager* duties shall require that the person to whom the duties are delegated meet the minimum qualifications of the *Program Manager* as defined in 23 CFR § 650.309 of the *NBIS*. In cases where delegation is to an entity, a designated person within that entity shall meet these same qualifications. This shall include the engineer approving Routine, In-Depth, Fracture Critical, or Underwater inspections conducted by a consultant or local agency.

5.2.2 Load Rating Engineer

The load rating function of the *LADOTD Bridge Inspection Program* shall be managed by the *Load Rating Engineer*. Per the requirements of 23 CFR § 650.309 of the *NBIS*, the *Load Rating Engineer* shall be a licensed civil or structural engineer in the *State of Louisiana*.

Per this *EDSM*, the *Load Rating Engineer* of the *LADOTD Bridge Inspection Program* shall be the engineer who is in charge of the *Bridge Rating Unit* within the *LADOTD Bridge Design Section*.

The *Load Rating Engineer* shall maintain a staff capable of determining safe load-carrying capacities of public bridges in accordance with the *AASHTO Manual, LA DOTD Bridge Rating*

Manual and LADOTD Bridge Maintenance Directives. The load rating engineer shall be responsible for:

- Establishing a load rating policy for all bridges on public roads
- Determining overload screening and evaluation procedure
- Establishing the safe load posting requirements
- Consistency for load ratings of all public bridges

The *Load Rating Engineer* may delegate certain duties to the *LADOTD Bridge Inspection Program Manager* and/or the local owners.

Delegation of any *Load Rating Engineer* duties to an individual or to an entity shall require that the delegated individual or the entity's designated individual shall be a *Licensed Civil Engineer* or *Licensed Structural Engineer* in the *State of Louisiana*.

5.2.3 Inspection Team Leaders

Each inspection *team leader* shall meet the minimum qualifications specified in 23 CFR § 650.309.

Up to 40% of the bridge inspection experience called for in the qualifications may be substituted by certain bridge design, bridge construction or bridge maintenance experience, if approved by the *LADOTD Bridge Inspection Program Manager*. The balance of the required experience must be in-service bridge safety inspection experience.

All requests for certification and/or substitution must be made in writing by the *Assistant District Administrator--Operations* of the involved *LADOTD* district. Supporting documentation should be included.

All consultant inspection team leaders must meet qualifications prior to being authorized to proceed or participate with the inspection.

Supporting documentation shall be provided to the *LADOTD Bridge Inspection Program Manager*.

5.2.4 Underwater Bridge Inspection Divers

All underwater bridge inspection divers performing underwater bridge inspection in the *State of Louisiana*; including those not directly employed by *LADOTD*:

- Must have completed an *FHWA*- approved comprehensive bridge inspection training course or an *FHWA*-approved *underwater* bridge inspection training course.
- Must meet all requirements for an underwater bridge inspection diver in accordance with 23 CFR 650.309 .

Supporting documentation shall be provided to the *LADOTD Bridge Inspection Program Manager*.

5.2.5 Bridge inspectors

All bridge inspectors performing bridge inspections in the *State of Louisiana*; including those not directly employed by *LADOTD*, must successfully complete an *FHWA*-approved comprehensive bridge inspection training course based on the *FHWA's Bridge Inspection Reference Manual (BIRM)*. The training course must be completed within 4 years of the inspector's employment as a *bridge inspector*.

All consultant inspectors must have completed training prior to being authorized to proceed or participate with the inspection.

Supporting documentation shall be provided to the *LADOTD Bridge Inspection Program Manager*.

Exceptions are limited to employees of local agencies who perform only the Special (interim) inspections in accordance with Maintenance Directives No. 4 and 5. However, DOTD strongly encourages that they complete the training.

5.2.6 Refresher Training

All individuals engaged in duties of the Program Manager or Inspection Team Leader during Routine, Fracture Critical, Underwater, Initial, or In-Depth inspections shall be required to meet the minimum refresher training requirements stipulated in the LADOTD Bridge Inspection QC/QA Manual in addition to the qualifications listed above.

5.3 Inspection frequencies

Frequency requirements for each inspection type are established by the NBIS in 23 CFR§ 650.311, supplemented by this EDSM, and applied by this EDSM to all bridge inspections in the State of Louisiana. The frequency requirements are described below.

The frequencies for inspections shall be determined by such factors as environment, construction material, state of maintenance and known deficiencies. Criteria and frequencies for more-frequent inspections can be found in *LADOTD Bridge Maintenance Directive No. 4*.

5.3.1 Initial inspections

The original or first inspection of a newly constructed bridge has no other definable frequency. Initial inspections may be performed at either the Routine level or the In-depth level, however an In-depth level inspection is preferred.

5.3.2 Routine inspections

The “normal” or default frequency for Routine inspections is 24 months. However, more-frequent inspections may be necessary for some bridges and less-frequent inspections may be allowable on other bridges.

Inspection intervals greater than 24 months for Routine inspections require written FHWA approval.

5.3.3 Underwater inspections

Underwater inspections shall be required for all bridges over water with structural components that remain submerged in 4 feet of water or more, or are otherwise inaccessible by wading/probing, during the regularly scheduled Routine inspections.

The “normal” or default frequency for Underwater inspections is 60 months. However, more-frequent inspections may be necessary for some bridges and less-frequent inspections may be allowable on other bridges.

Inspection intervals greater than 60 months for underwater inspections require written FHWA approval.

5.3.4 Fracture-critical member (FCM) inspections

Bridges that have been identified as having fracture-critical members (FCM's) require an FCM (i.e. “Hands-On”) Inspection of the FCM's at intervals not greater than 24 months. The regularly scheduled FCM inspection shall be completed as part of the Routine inspection.

5.3.5 Special, Damage, and In-depth inspections

These inspections shall be conducted in accordance with the *LADOTD Bridge Maintenance Directive No. 4* and/or on an as-needed basis as determined by the Assistant District Administrator (ADA) of Operations, District Bridge Engineer, Program Manager, Load Rating Engineer, and/or Bridge Inspection Engineer.

5.4 Inspection procedures

5.4.1 AASHTO MBE

Each bridge shall be inspected in accordance with the inspection procedures set forth in the AASHTO MBE.

5.4.2 Team leader

Each Routine, In-depth, Underwater and FCM inspection shall include the presence of at least one *team leader* who meets the requirements set forth in this directive above.

Damage inspections and Special inspections do not require the presence of a team leader, but the presence of one is recommended.

5.4.3 Bridge load rating

Each bridge shall be load rated as to its safe load-carrying capacity in accordance with the AASHTO MBE and with LADOTD EDSM I.1.1.8.

Bridges shall be posted or restricted in accordance with LADOTD EDSM I.1.1.8 when the maximum unrestricted legal loads or state routine permit loads exceed those allowed under the operating rating or equivalent rating factor.

5.4.4 Evaluation for scour vulnerability

All bridges over waterways shall be evaluated for existing scour and scour vulnerability. Those evaluations shall be in accordance with *Hydraulic Engineering Circular No. 18 (HEC-18)* and with the *LADOTD Policy for Predicting Scour Elevation for Bridges (11/2/2009)*.

The NBIS requires that for bridges identified as “*scour critical*”, a plan of action shall be developed and implemented to monitor known and potential deficiencies and to address critical findings. (See 23 CFR 650.313 (e) (3))

5.4.5 Complex bridges

Bridges that require specialized inspection procedures and/or additional inspector training or experience shall be identified as complex bridges. Each complex bridge shall have its own specialized inspection procedures, and shall be inspected according to those procedures. (See 23 CFR 650.313)

5.4.6 Critical findings

A critical finding is defined as “*a structural or safety-related deficiency that requires immediate follow-up inspection or action*” (23 CFR 650.305).

The NBIS requires that: “a statewide procedure shall be established to ensure that critical findings are addressed in a timely manner. The FHWA shall periodically be notified of actions taken to resolve and/or monitor critical findings”. (See 650.313 (h))

The procedure for addressing critical findings more specifically defined in the *LADOTD Bridge Maintenance Directive No. 13*.

5.4.7 Temporary Bridges

Bridges that have been replaced with temporary structures to provide service to the traveling public shall be regularly inspected as required. Documentation of conditions shall be in accordance with Maintenance Directive No. 10/11.

Temporary bridges constructed as part of a bridge replacement project are the sole responsibility and liability of the contractor. The contractor's engineer shall inspect and verify the safety and adequacy of the temporary detour bridge for as long as it remains in service during the contract period.

5.5 Bridge inspection records

The findings and results of bridge inspections shall be recorded on *LA DOTD* standard forms. The bridge inspection records shall become part of the bridge file. See *Section 5.7* of this *EDSM*.

The data required to complete the forms, as well as guidance with the functions that must be performed in order to compile the data, can be found in the current editions of following manuals/documents:

- *AASHTO MBE*.
- *FHWA Recording and Coding Guide for the Structural Inventory and Appraisal of the Nation's Bridges*, also known as the *FHWA SI&A Recording and Coding Guide*.
- *LA DOTD Recording and Coding Guide*.
- *LA DOTD Bridge Maintenance Directives Manual (Directive No.8)*.
- *LA DOTD PONTIS Manual*.

5.6 Bridge inventory

LADOTD shall prepare and maintain an inventory of all bridge structures subject to the *NBIS*.

5.6.1 Collection and retention of data for bridge inventory

Inventory data shall be collected on standard data forms and will be submitted annually to the *FHWA* as support for *LADOTD*'s infrastructure needs.

The bridge inventory data shall become part of the *bridge file*. See *Section 5.7* of this *EDSM*. Guidance for the collection and retention of bridge inventory data can be found in the following documents:

- *FHWA Recording and Coding Guide for the Structural Inventory and Appraisal of the Nation's Bridges (SI&A Recording and Coding Guide)*
- *LA DOTD Recording and Coding Guide*
- *LA DOTD Bridge Maintenance Directive No. 8*
- *AASHTO MBE*
- *LADOTD PONTIS Manual*

5.6.2 Time limits for data entry into bridge inventory

The *NBIS* establishes time limits for entering *SI&A* data into a state's bridge inventory. Per this *EDSM*, the limits that shall apply to *SI&A* data on all bridges in the *State of Louisiana* that are governed by the *NBIS* are 45 days for data on state-owned bridges and 90 days for data on bridges owned by other entities.

- For data from all inspections the time limits shall be measured from the date of inspection.
- For data on new bridges and from modifications to existing bridges that alter previously recorded data, the time limits shall be measured from the date that physical completion the work has progressed to a point that safe collection of the required data is possible.
- For data concerning changes in load restrictions or changes in closure status, the time limits shall be measured from the date that the decision is made to change the load rating or closure status.

This *EDSM* also stipulates that the date on which inventory/condition information is collected is the date on which load rating needs shall be evaluated or performed.

Inspections and load ratings performed by consultant contracts shall submit a completed and approved bridge inspection form (3097_PO) and/or load rating summary sheet to the project manager within the time limits above.

5.7 Bridge files

A *bridge file* for each bridge shall be prepared and maintained for all bridges subject to the *NBIS*. The files should contain information from over the life of the bridge as much as possible. Data and documents in the bridge file shall be consistent with the AASHTO MBE. Items typically include, but not be limited to, the following:

- Inspection reports, structural inventory & appraisals, and load ratings.
- Construction plans, specifications, shop drawings, and as-built plans.
- Records pertaining to maintenance, material tests, load tests, accidents, floods, postings and load permits
- Correspondence and photographs that pertain to any of the above records.

A more detailed list of items that should be included in a *bridge file* can be found in the *AASHTO MBE, Section 2*.

5.8 Quality control/quality assurance (QC/QA)

The *NBIS* requires that *quality control (QC)* and *quality assurance (QA)* procedures shall exist within a state's bridge inspection organization in order to maintain a high degree of accuracy and consistency in the inspections (23 CFR 650.313).

The aforementioned section of the *NBIS* also directs that the QC/QA procedures shall include:

- Periodic review of inspection teams
- Periodic bridge inspector refresher training for program managers and team leaders
- Independent review of inspection reports and computations

This EDSM affirms that the LADOTD Bridge Inspection Program has complied with these requirements by the creation of a QC/QA Program within the *Bridge Inspection Program*. The QC/QA Program has developed a QC/QA Manual that sets forth the policies, guidelines and procedures of the QC/QA Program.

The QA/QC Program shall be managed by a *Civil Engineer* licensed in the *State of Louisiana*.

6. RESPONSIBILITY:

The LA DOTD Structures and Facilities Maintenance Engineer (acting as the official Program Manager for the Louisiana Bridge Inspection Program) shall be responsible for implementing this directive and shall issue specific directives as necessary to insure that Louisiana is in compliance with the *NBIS*.

7. OTHER ISSUANCES AFFECTED:

All directives, memoranda or instructions heretofore in conflict with this directive are hereby rescinded.

8. EFFECTIVE DATE:

This Directive shall become effective immediately upon receipt.



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